DHS Science &Technology Directorate
Borders & Maritime Security Division

Cargo Security Programs

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From Science and Technology…
Security and Trust

Overview

- Global supply chain security, efficiency and resiliency is among DHS top priorities for 2011, per DHS Secretary Napolitano

- We are interested in advancing new security measures, global guidelines and standards that are applicable to all modes of transport

- Technologies are used to:
  - Add additional “layers” of security to U.S. “layered defense” posture
  - Enable options that would enhance efficiency and/or resiliency of commerce flow
  - Inform drafting of performance standards and guidelines

- Close collaboration among global stakeholders and strategic partners is imperative to success

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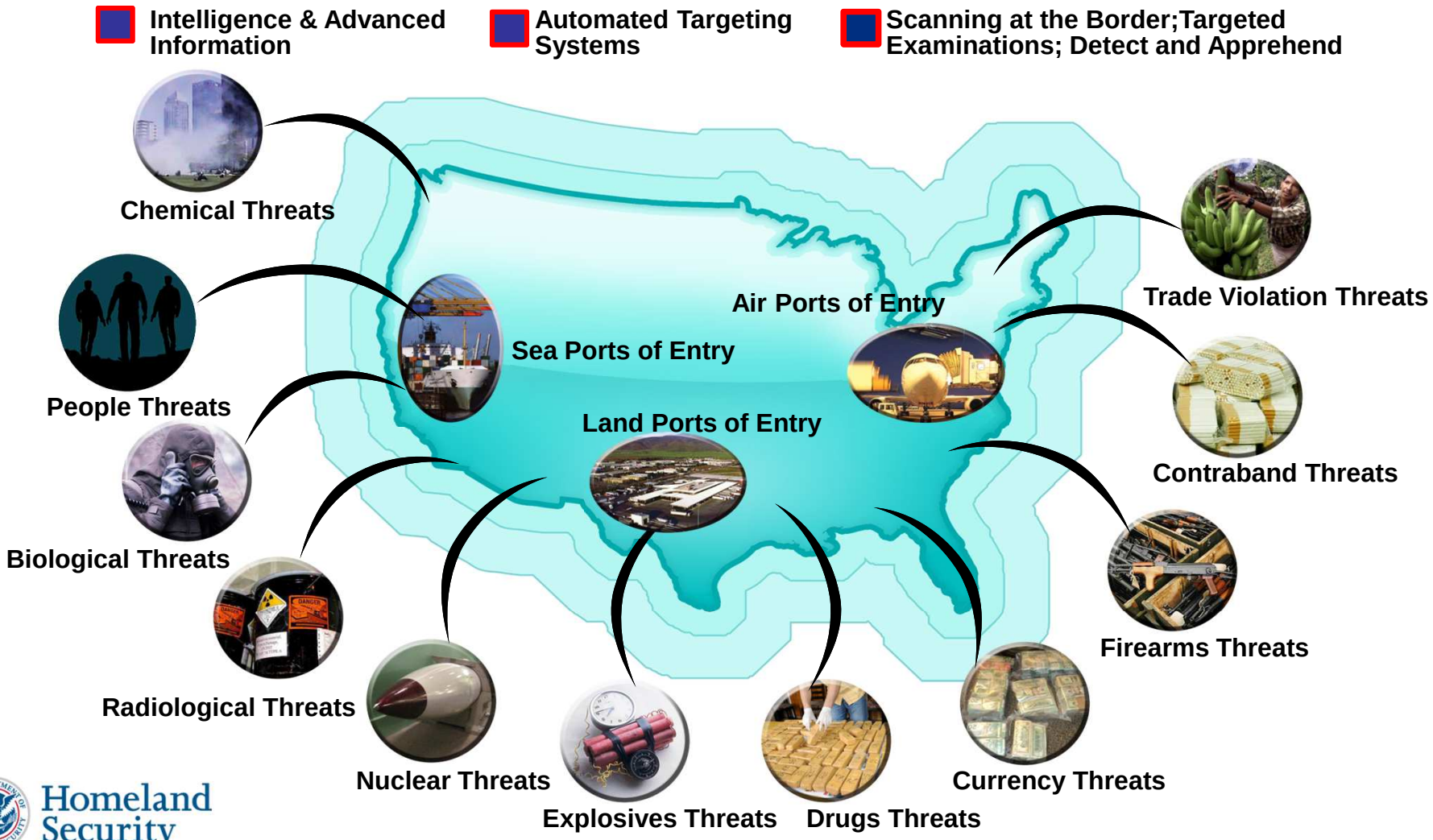
U.S. Ports-of-Entry Operational Overview

- 327 POEs in US, 15 pre-clearance offices in Canada and the Caribbean
- Daily operations: Screening ~ 1M people, vehicles and >50,000 cargo containers



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U.S. Customs & Border Protection
Operational View and Requirements

CSD Concept of Operations

- Trusted partners are responsible for stuffing conveyance
- Trusted partners or CBP shall be responsible for installing and arming CSDs
- While in transit, the CSDs will monitor sealed container doors for unauthorized intrusions and log alarms
- CBP will interrogate the CSDs using fixed readers to determine alarm status
- If CSD reports alarm or failure, CBP shall respond with protocols such as seal verification or non-intrusive inspection

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CSD Requirements

From CBP CSD Requirements document

Physical

- Compatible with general purpose ISO 668 containers or trailers
- No specialized tools or conveyance modifications required.
- Shall not adversely affect shipping operations

Performance

- Report door as open if moved ≥ 2” for ≥ 1 sec
- Probability of detection (Pd) of 95% or greater
- Probability of success of 96% or greater
  - Success defined to be no false alarms and no critical failures
- Sufficient power to support a trip of 70 days

Communications

- Comm. protocol based on IEEE 802.15.4b standard, 2.4 GHz
- Alternate communications may be proposed by vendors

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At the Ports-of-Entry

Current Operations	S&T Goals	Tech Efforts
Cargo Screening		
Primary: via Automated Targeting System (ATS) for risk scoring, using info from human sources	Increase accuracy in targeting cargo for physical scanning	ATS Upgrade
Cargo Scanning		
Primary 100% scan for Rad/Nuke only via Radiation Port Monitors	New primary capability without container opening; supplement human data with machine data	Vapor analysis of container content
Secondary via imaging (2-11% of total cargo); only detect anomalies; needs tertiary, potentially dangerous inspection 	new mobile capability to scan cargo in-situ (expedite rail cargo; enable safe options for tertiary)	Vapor analysis of container content
	new secondary means via portable/desktop systems	Vapor/particulate/trace analysis
Supply Chain Security		
CTPAT, CSI and other initiatives	New capability to reduce the size of the "haystack" and expedite "trusted" flow via green lanes/ports	Intrusion/tamper detection Pilot Secure Transit Corridor for land routes into US

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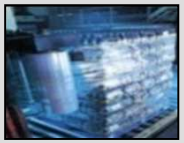
DHS Science & Technology Efforts

Cargo Security Projects

SUPPLY CHAIN SECURITY		
Container Security Device (CSD)	Monitors and reports the opening or removal of container doors. Phase II testing to completed FY11.	
Advanced CSD / Hybrid Composite Container	Next generation ISO composite shipping container and Unit Load Device (ULD) with embedded security sensors to detect and report tampering or intrusion from the point-of-consolidation to the point-of-deconsolidation. Lighter but stronger than steel containers.	
Marine Asset Tag Tracking System (MATTS)	Enables global tracking and communication through the use of radio frequency (RF), cellular and satellite technologies. MATTS is the communication link for CSD, Marine Composite, and Air Composite Containers.	
Secure Transit Corridors	A potential pilot that will provide a leave-behind capability to operate four supply chain routes (three truck and one rail) from Mexico and Canada, which will include Electronic Chain of Custody (ECOC) security devices, encrypted data server, tracking and monitoring software, and a global communications capability.	
Secure Carton	Shipping carton with embedded sensors to detect tampering and transmit alerts when interrogated by inspectors.	
Secure Wrap	Tamper-indicative wrapping material to secure and monitor palletized cargo after it leaves the point-of-manufacture to the point-of-delivery.	

Container Security Device (CSD)
Marine Asset Tag & Tracking System (MATTS)

- Pursuing Performance Specification incorporating Open Standards and Open Architecture

- Key Development areas
  - Detection of door opening and door removal
  - Sensor monitoring and notification through event logging and alarming
  - Performance to maximize detection of door breaches while minimizing false alarms
  - “Point of stuffing” to final destination monitoring
  - Reliable and secure communications
  - Seamless security data transition between industry and DHS systems
  - Environmental conditioning
  - Power Management

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Marine Hybrid Composite Container Development

- Pursuing Performance Specification incorporating Open Standards and Open Architecture
- Key development areas:
  - Detection of intrusion through any of container's 6 sides
  - Detection of container door removal and human inside
  - Standard interface protocol for future sensor integration (explosives, radiation, nuclear, chemical, biological, etc.)
  - Sensor monitoring & notification through event logging and alarming
  - Reliable and secure communications

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Secure Transit Corridors: A Joint S&T – CBP Pilot

Purpose

- Deploy new technology and infrastructure to help create Secure Corridors for C-TPAT* Tier III with land cargo from Mexico and Canada to US.
- Confirm cargo integrity to expedite border crossings & protect in-bond cargo interest.

Approach

- Pilot the use Electronic Chain-of-Custody devices to monitor cargo door tampering from point of loading to unloading for 2 cargo routes from Canada and 2 from Mexico
- Cargo information and alarms routed to CBP's Laboratories and Scientific Services Tele-Forensics Center for dispatching.

Deliverables

- Interim capability for 4 C-TPAT Tier III cargo routes from Mexico &Canada
- Cost estimates for full-scale implementation and acquisition planning
- Performance standards & test plans for certifying devices from open market
- Process for tech vendors and C-TPAT Tier III participants to qualify for SAFETY ACT protection using block designation

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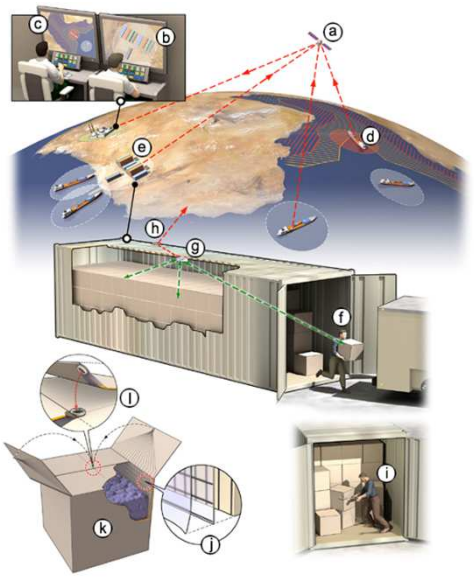
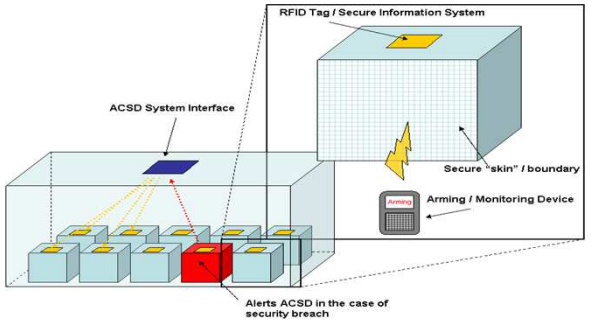
*C-TPAT = Custom – Trade Partners Against Terrorism

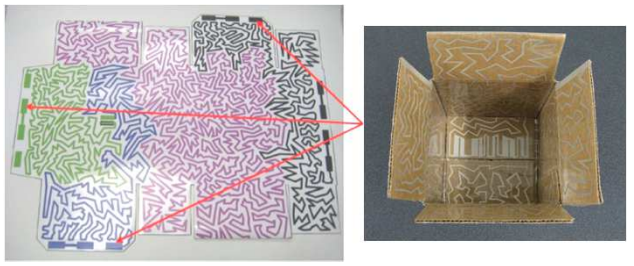
Secure Carton

- Developing a tamper-evident carton that, once stuffed and sealed by a trusted entity, can be rapidly screened for intrusion at an examination point such as an air cargo facility

- Key development areas:
  - Pseudo-random conductive grid embedded in the carton wall that will detect cutting, puncturing and/or tampering
  - Semi-active RFID tag integrated with the grid to hold grid state and report that state when interrogated (to comply with aviation regulations)
  - Design to complement Secure Wrap, cargo security seals and other container security devices







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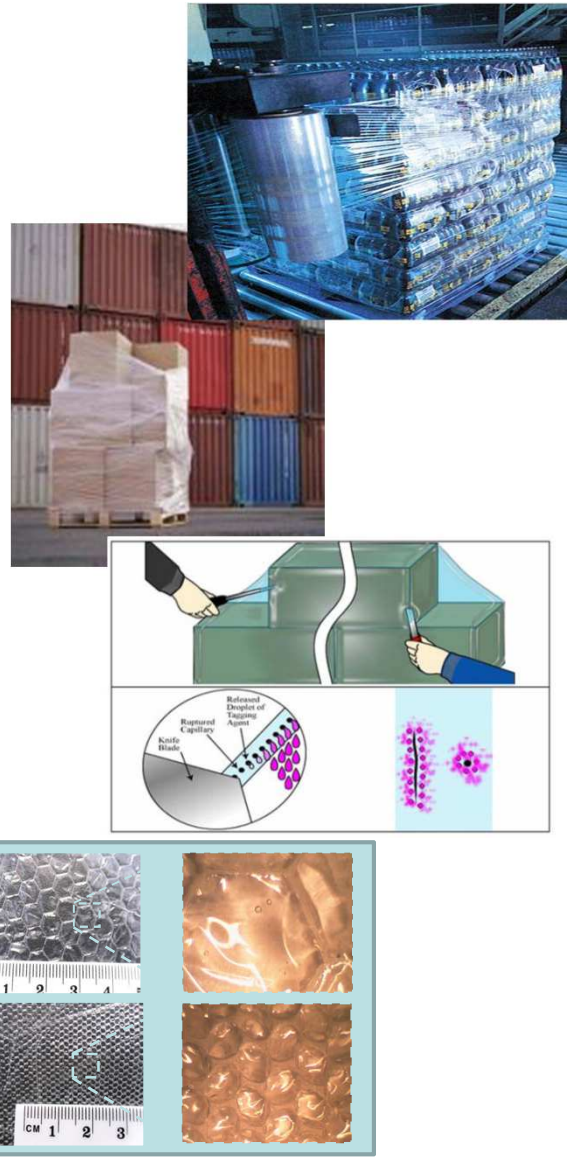
Secure Wrap

- Developing a tamper-evident wrap for palletized goods or a collection of boxes that, once wrapped by a trusted entity, can be rapidly screened for intrusion at an examination point such as an air cargo facility

- Key development areas:
  - Chemical properties that, when tampered, will show bruising on the wrap surface
    - Dye color readily evident to inspectors
    - Persistent, does not fade in short term
    - Resistant to cleaning
  - Mechanical properties that are essentially indistinguishable from standard wrap
  - Designing to complement Secure Wrap, cargo security seals and other container security devices



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Cargo Security Tech Demos & Pilots

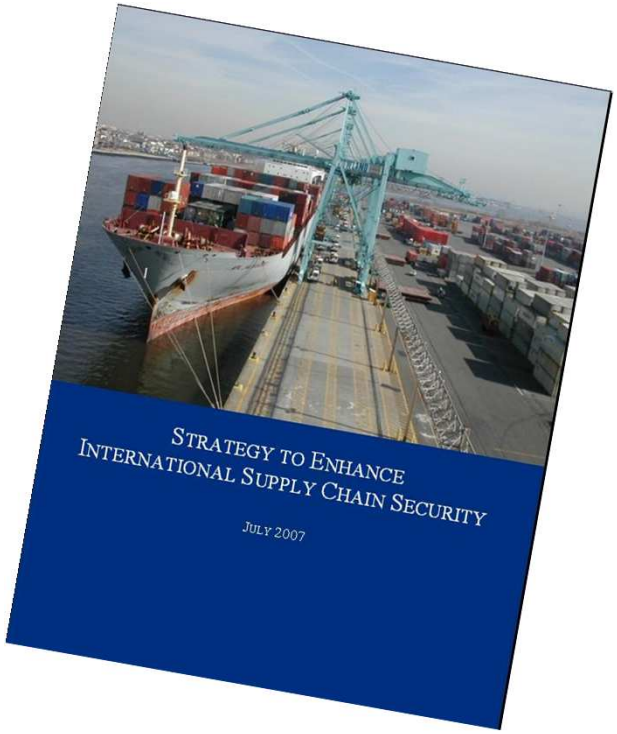
- CSD International Trade Lane Pilot (Sep ‘10)
  - 27 CSD sets supported cargo in transit from Shanghai, China to Port of Savannah, U.S.

- Cargo Security Tech Demo at Sandia National Lab (Aug ‘09)
  - CSD, MATTS, Electronic Chain of Custody and Hybrid Composite Container
  - Attendees: DHS, international partners, port authorities, cargo shippers/carriers, congressional staff and media

- MATTS Pilot for TSA (Jan ‘09)
  - 100 Electronic Chain-of-Custody devices outfitted with MATTS (for communication) supported four air cargo routes

- MATTS Pilot in Japan (Jan ‘07)
  - 100 Tags departing from Yokohama, Japan to Los Angeles/Long Beach, U.S. then to Illinois, U.S.

Development of U.S. Strategy for Global Supply Chain Security



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Scope of the National Strategy

The Strategy addresses:

- Legitimate commercial supply chain security and its security integrity
- All modes (air, land, and sea)
- All types of cargo (containerized and non-containerized)
- All nodes (point of manufacture to point of destination)
- All people associated with nodes and cargo (e.g. workers)

The Strategy doesn't address:

- Illicit smuggling and trafficking, and private transport
- Cyber Security
- Passengers
- Telecommunications, IT, Energy Systems
- Economic supply chain management

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Summary of the National Strategy

- Articulates an integrated Federal vision for collaborating broadly to manage the risks presented both by and to the global supply chain system

- Goals:
  - Enhance the secure, efficient, and reliable supply chain system
  - Strengthen system resiliency against catastrophic disruptions

- Provides a common roadmap to guide Federal departments and agencies as they work with State, local, and tribal governments, the private sector, and international partners to meet the goals of a safe, secure, and well-functioning supply chain system

Key Principles

- Manage risks through focused measures:
  - **Deterrence**: Implement security measures throughout the global supply chain system aimed at deterring terrorists or other bad actors from exploiting the system as a channel to do harm
  - **Protection**: Protect supply chain infrastructure critical to the continued operation of the global supply chain system as a whole
  - **Resilience**: Enhance resilience throughout the system, through the ability to surge, flex, and quickly recover from disruptions
- Prioritize investments aimed at improving the efficiency of the system for moving commerce

Improving the System

- To improve system efficiency and functionality, the Strategy commits to:
  - Streamline and reform government security processes, some of which may unnecessarily constrain the movement of lawful commerce;
  - Adapt and develop new technologies that simultaneously achieve both greater security and the efficient movement of commerce; and
  - Expand, develop, and modernize supply chain and border infrastructure.

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Next Steps

- Near-Term Priorities for Securing and Facilitating Global Supply Chain Security
  - Securing and Facilitating the Flow of Maritime Containerized Cargo
  - Strengthening the Security and Facilitation of Air Cargo
  - Securing and Facilitating North American Commerce
  - Enhancing Resilience and Expediting Trade through Infrastructure Improvements
- Next Steps
  - Solicit stakeholder input on supply chain security recommendations
  - Complete risk and threat assessments

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